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HOMOPTERA INJURIOUS TO GRASSES.

AMONG the many insects that are destructive to the grasses the little leaf-hoppers take a very prominent place, and the writer is of the opinion that, although their work is often or for the most part entirely overlooked, they are really re-

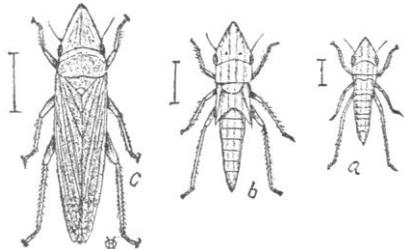


FIG. 1.

Diedocephala mollipes (Original).

sponsible for much of the damage accredited to other insects or to drought. Studies carried on during the last few years, and which have been reported in bulletins of the United States Department of Agriculture^{1,2} and of the Iowa Experiment Station,^{3,4} lead to the opinion that from one-fourth to one-half of the crop is lost regularly as a result of their work, and that a large part of this loss could be saved by the adoption of remedial measures. It seems also, at least for bluegrass in Iowa, that the common affection known as "silver-top" is to be charged against these same insidious enemies.⁵

While there are many different species concerned in this work, many of which have still to be studied, and representing the families *Jassidae*, *Cercopidae*, and *Fulgoridae*,



FIG. 2.

Deltoccephalus inimicus (Original).

the most numerous, and I think the most destructive, fall in the family *Jassidae*, and a few of the more common ones may be enumerated here.

Diedocephala mollipes is a grass-green species about one-third of an inch in length, and its general form, as well as the larva and pupa are shown in the accompanying figure. It occurs abundantly all over the country, but may be noticed more abundantly some seasons than others, and it shows a preference for ground that is moist rather than for very dry localities.

A quite similar species, *Diedocephala noveboracensis*, is

¹ Bulletin No. 22, Division of Entomology, United States Department of Agriculture, pp. 20-41.

² Bulletin No. 23, Division of Entomology, United States Department of Agriculture, pp. 58-59.

³ Bulletin No. 18, Iowa Experiment Station, pp. 95-101.

⁴ Bulletin No. 15, Iowa Experiment Station, pp. 253-261.

⁵ Proceedings of the Society for Promotion of Agricultural Science (1890).

also quite abundant and widely distributed, but seems to occur more especially around the borders of thickets and in grassy woodland.

Perhaps the most abundant and widely distributed species of all is the *Deltoccephalus inimicus* of Say. Its work ranges all through the season, and it may even be found on warm days in winter.

The insect is nearly a fourth of an inch in length and of a grayish color, the most distinctive marks being the black dots on head, front portion of thorax, and on the scutellum; two on each, as shown in the accompanying figure.

Another species which occurs, at times in immense numbers, is the *Deltoccephalus debilis* of Uhler. This is smaller than the preceding species, but without a careful examination may be very easily confused with it. It is quite uniform in color, and without the black dots characteristic of that form. Its distribution is probably very wide, though it has



FIG. 3.

Deltoccephalus debilis Uhl. (Original)

not as yet been reported from as many localities as the preceding species.

Aside from these especially abundant species there are many others belonging to the genus *Deltoccephalus*, which seem to be confined to grasses as their food plant. *D. sayi*, *D. harrisi*, *D. melsheimeri*, and others having been taken in greater or less abundance in sweepings from grass.

Cicadula exitiosa Uhler was first described as a wheat pest, but it has proven a general grass feeder, and must be enumerated among the species affecting this crop. It is about two-tenths of an inch in length, of a brownish color, and the wings are quite distinctly marked with dark veins.



FIG. 4.

Cicadula exitiosa Uhl. (Original)

The figure shows its form and the arrangement of the markings of the body.

Agallia sanguineolenta Prov. is an interesting little species, often secured in grass and conspicuous in very early spring, as the adults can be seen in great numbers under the grass or, on warm days, hopping about on the leaves. It has proved, however, to favor clover as its food plant, and probably feeds on grass only during fall, winter, and early spring. It is about one-eighth of an inch in length, quite broad, about half as wide as long, and marked with numer-

ous dark blotches and short stripes, especially on the wings. This species appears to be double-brooded in the latitude of Iowa, though it is possible that three broods may occur.

The habit these insects have of hopping into the air on the least disturbance renders them open to direct attack with the "hopper-dozer" principle, which has been used so extensively in the contests with the Rocky Mountain Locust.

We have found, however, that a very simple plan of using this principle is the most effective in securing the leaf-hoppers. It consists in coating the upper surface of a sheet of sheet-iron with coal tar, attaching cords at either end, and also in the centre if it is very long, with which to draw it,

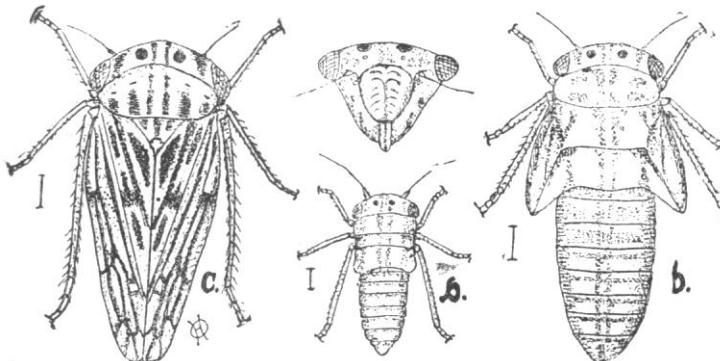


FIG. 5.

Agallia sanguinolenta: A. larva; B. pupa; C. imago, and front view of head of imago. (Original). Size lines are a little too long.

and then it is drawn over the lawn or pasture at a moderate walk by a boy or man at each end.

As soon as the sheet becomes covered with hoppers so that all are not held when they strike the pan a new coat of tar is applied. On an extensive scale this can be used at a cost of but a few cents per acre, and is applicable to large pastures and meadows. Upon lawns and pastures the treatment may be applied at any time when the hoppers appear numerous, but in meadows it is not applicable while the grass is in bloom on account of the accumulation of pollen on the sheet. In general, the best time to apply it is in early May and again, if hoppers are present, in summer, directly after the hay-crop has been secured. HERBERT OSBORN.

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ASTRONOMICAL NOTES.

THE following is an ephemeris for the comet discovered by Denning on March 18. The epoch is for Berlin Midnight:

	R.A.			Dec.	
	h.	m.	s.	°	'
April 25	2	18	44	+ 58	5.8
	26	23	16	57	53.7
	27	27	43	57	41.4
	28	32	5	57	28.8
	29	36	23	57	15.9
	30	40	36	57	2.8
May 1	44	45		56	49.5
	2	48	49	56	36.0
	3	52	49	56	22.2
	4	2	56	45	56
	5	3	0	55	54.2
	6	3	4	55	54.2
	7	3	8	55	25.6

This comet is now increasing its distance from the earth, but in the autumn the comet will again approach the earth, and observations will be possible far into next December.

The following is an ephemeris for the comet discovered on March 6 by Dr. Swift of Rochester, N.Y. The epoch is for Berlin midnight:—

	R.A.	Dec.
	h. m. s.	° '
April 25	22 14 21	+ 16 10.0
	26 17 30	16 57.9
	27 20 37	17 45.0
	28 23 42	18 31.2
	29 26 46	19 16.6
	30 29 48	20 1.2
May 1	22 32 49	20 44.9
	2 35 48	21 27.8
	3 38 46	22 9.8
	4 41 42	22 51.0
	5 44 36	23 31.4
	6 41 29	24 11.1
	7 22 50 20	+ 24 50.0

These ephemerides are taken from No. 3,082 of the *Astronomische Nachrichten*. That for comet Swift was computed by Dr. Lamp, and that for comet Denning by Dr. Schorr.

The new star in Aurigæ has now become so faint that it can be observed only in the larger telescopes. It is fainter than the 13th magnitude.

G. A. H.

NOTES AND NEWS.

MR. G. C. GREEN records in *Nature Notes* for April a curious reminiscence with regard to a pair of jackdaws kept by him at Modbury Vicarage, South Devon, about twenty years ago. They had been taken from the nest, and during the first summer their wings were slightly clipped. After this their wings were allowed to grow, and they lived at full liberty in the garden. They were perfectly tame, and would come at call and feed out of the hand, would come into the house, and in the morning knock at the windows to ask for some breakfast. In the spring they used to fly away and join their wild companions, make their nests, and rear a family; but when this was over they came back to the garden again, fed from the hand, and were as tame as ever. But the curious thing was, that after one or two seasons they brought another jackdaw with them, presumably the young of one of them, which was just as tame as themselves, although nothing had ever been done to tame it, so that it was impossible to tell which were the original favorites, and which was the new one. Moreover, when after a few years one of these jackdaws was accidentally killed, another was brought by the other two.

— A Seaside Laboratory of Natural History, in connection with the Leland Stanford, Jun., University, will be opened during the coming summer at Pacific Grove, Cal., on the Bay of Monterey, about half-way between Monterey and the Point of Pines. This laboratory will be for the purposes of investigation in the life-history of the marine animals and plants of this coast. It will be under the direction of Professors Gilbert, Jenkins, and Campbell of the chairs of zoology, physiology, and botany respectively. It will be open to naturalists and others wishing to make special investigations in the anatomy or life-history of animals and to teachers of natural science. For further details those interested may apply to any of the directors at Palo Alto, Cal.

— In a discussion on diphtheria, published in the *British Medical Journal* for Sept. 19, 1891, Dr. Russell cited several instances in which steam had seemed to be an active factor in the propagation of the disease. Hot water and steam from a brewery were introduced into some old cesspools and evidently waked into activity germs which, if undisturbed, would have remained dormant.

— A new edition of S. Dana Horton's "Silver in Europe" will be published immediately by the Macmillans. The author has made some additions of importance to this edition in view of the present attitude of Congress on the question of free silver.